

# Bioterrorism Preparedness - Laboratory Analysis

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# Bioterrorism Preparedness - Laboratory Analysis

An account from  
the “real world”  
of the clinical  
microbiology  
laboratory



# Clinical Laboratories - The Need for Preparation

- Agents likely to be used by terrorists
  - Unfamiliar, rarely encountered organisms
  - Potential for misidentification, mishandling of specimens, laboratory acquired infection
- Public health agency-sponsored training in the Northeast began in 1999
- Laboratory Response Network (LRN)
- Were we prepared in the autumn of 2001?

# Autumn, 2001 - Anthrax!

- Wake-up call for clinical microbiologists
- Expect the unexpected
- Preparedness is an absolute necessity

**LAB LABEL**

**Outpatient Requisition Clinical Laboratories**

DATE COLLECTED: \_\_\_\_\_ TIME COLLECTED: \_\_\_\_\_ PHIB: \_\_\_\_\_

ORDERING PHYSICIAN NAME: \_\_\_\_\_ PROVIDER# \_\_\_\_\_

COPY TO PHYSICIAN NAME: \_\_\_\_\_ SPECIMEN TYPE/SITE: *throat swab*

ICD - 9 CODES: \_\_\_\_\_ PROVIDE DX IF CODE UNKNOWN: *cough paric disorder*

ATTENTION: All services ordered for the patient must meet the definition of medical necessity (i.e., required to diagnose or treat an illness or injury). Documentation must be sufficient to demonstrate same.

REFER TO BACK FOR PARTIAL DIAGNOSIS LISTING

r = 5mL red B = 10mL red c = 5mL (green/gel) G = 5mL grey (half-full) L = 3mL lavender b = 4.5 mL blue u = urine

**MICROBIOLOGY SECTION**

(Susceptibility performed when required)

☐ Beta Strep Culture, throat only

☐ Cervical Culture

☐ Chlamydia (Body Site required: \_\_\_\_\_)

☐ Gonorrhea (Body Site required: \_\_\_\_\_)

☐ Herpes (HSV), (Body Site required: \_\_\_\_\_)

☐ Heterophile Antibody (Monospot)

☐ Ova & Parasites

☐ Stool Culture

☐ Urine Culture

☐ Vaginal Culture

☐ Measles Ab

☐ RPR (serology)

☐ Rubella Ab

☐ HIV Viral Load

☐ Other: \_\_\_\_\_

☒ Other: *ANTHRAX*

Comments: *Sony!*

# LRN Level A Lab Preparedness

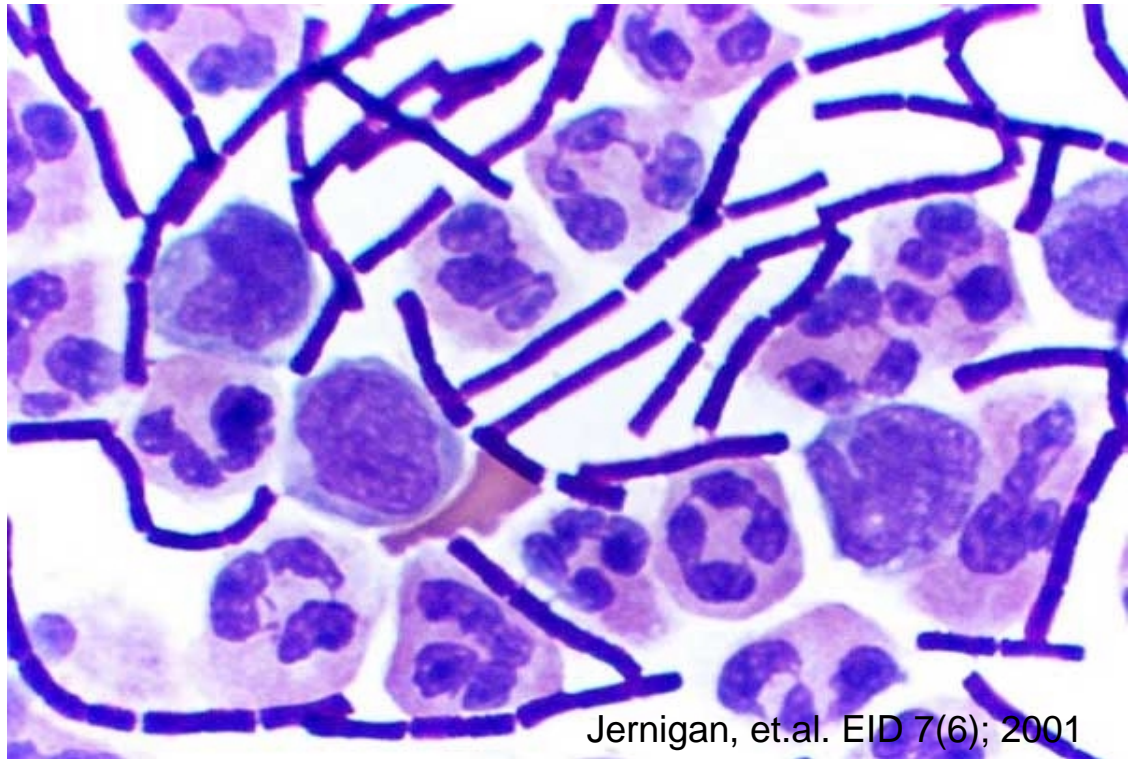
- Level A laboratory functions
  - Rule out / refer
  - Ship suspicious infectious agents to higher level labs for further study
- Level A laboratory activities
  - Formulate laboratory procedures
  - Train staff
  - Biosafety concerns
- Assistance from public health agencies

# Activities of Clinical Micro Labs

- “Average” Labs
  - Microscopic examination of specimens
  - Culture of specimens and isolation of many bacterial and fungal pathogens
  - Identification and susceptibility testing
- “Advanced” Labs
  - Viruses (culture, direct detection)
  - Mycobacteria (culture, susceptibility)
  - Certain fungi (culture and identification)
  - Molecular testing

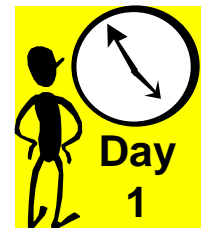
# Level A Lab Example: *B. anthracis*

- Gram stain\* of CSF, positive blood culture or wound culture shows large gram-positive rods



Jernigan, et.al. EID 7(6); 2001

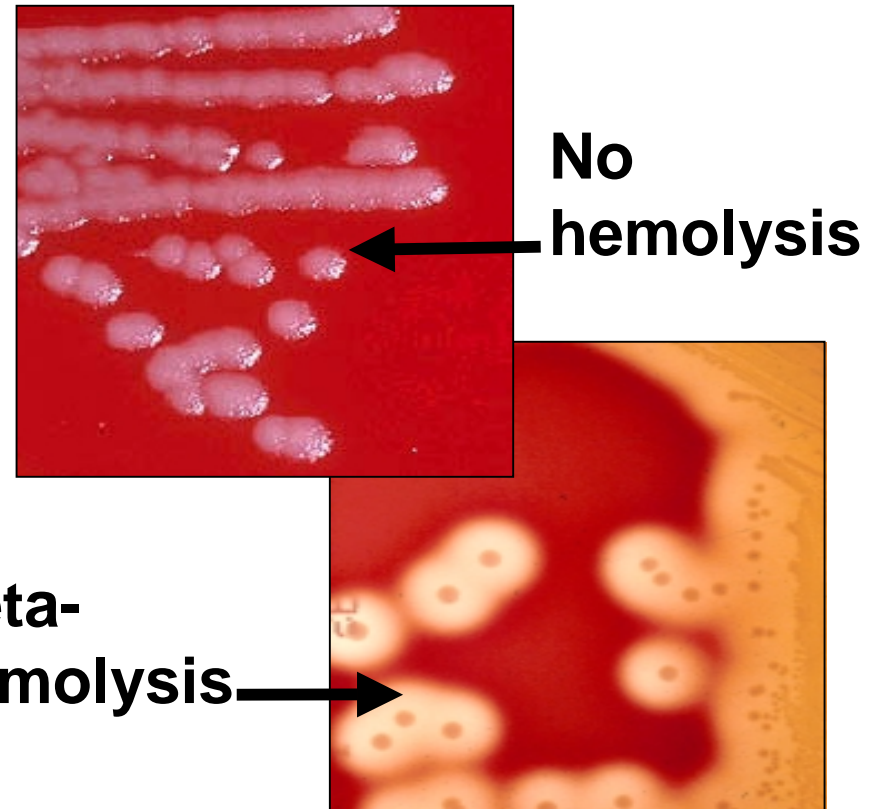
\*Gram stain: Differential stain, not specific, but can be extremely helpful





# Level A Lab Example: *B. anthracis*

- Culture on blood agar\*. Examine for characteristic colony morphology and lack of beta-hemolysis



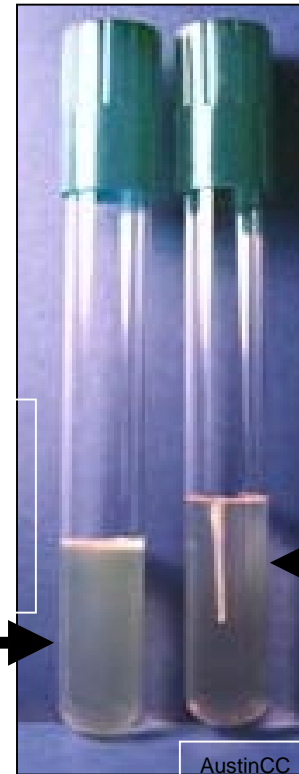
\*Agents of anthrax and plague are “easy” to grow. Agents of tularemia, brucellosis are harder to recover, may require special media



# Level A Lab Example: *B. anthracis*

- Perform identification tests. For ?*B. anthracis*, perform motility test\*

Growth throughout medium (motile)



Growth only near original inoculation stab (non-motile)

\*Minimal rule out tests (minimal manipulation of potentially dangerous cultures) are recommended for Level A labs



# Level A Lab Example: *B. anthracis*

- Ruled in?
  - *Bacillus* species with characteristic colony morphology, non-hemolytic, non-motile
- REFER
  - Contact Level B lab
  - Ship suspect isolate



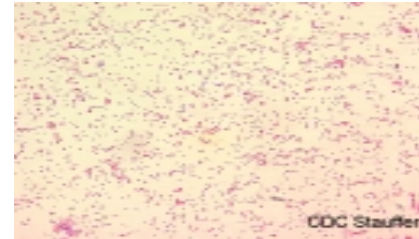
# Level A Lab Preparedness - Where Are We Now?

- Bigger seems to be “better”
  - Wider variety of pathogens encountered; personnel experienced in working with infrequently isolated agents
  - More and/or better biosafety equipment
  - Institutional support for needed resources is more likely in larger hospitals
- Small labs can still have successful preparedness programs

# Level A Lab Preparedness



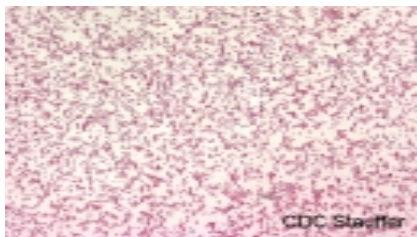
**Anthrax**



**Brucellosis**



**Plague**



**Tularemia**



**Botulism-  
Specimen processing/  
shipping only**



**Smallpox, VHF-  
More guidance needed  
for Level A labs**



**Environmental testing  
for *B. anthracis* spores**

# Clinical Lab Preparedness – Next Steps

- Extend training (category B agents)
- Enhance communication/cooperation with higher level public health labs
  - NLS
- Dissemination of some Level B procedures to select Level A labs
  - ?Rapid, specific tests/reagents
  - ?BSL3 activities in select labs
  - ?Surge capacity

# Level A Clinical Microbiology Laboratories

- Can be instrumental in early recognition
- Must be trained, alert and vigilant
- Form partnerships with public health labs for BT preparedness assistance, BT response plans, and overall improvement of the public health system